What is claimed is:

- 1. A method of polymerizing an aromatic monomer, comprising combining an aromatic monomer with a hematin catalyst, wherein the hematin catalyst has been derivatized with one or more non-proteinaceous amphipathic groups.
- 2. The method of Claim 1, further comprising combining a peroxide initiator with the aromatic monomer and the derivatized hematin.
- 3. The method of Claim 2, further comprising a template, wherein the aromatic monomer aligns along the template and polymerizes to form a complex comprising the polymerized aromatic monomer and the template.
- 4. The method of Claim 3, wherein the template is a polyelectrolyte.
- 5. The method of Claim 4, wherein the polyelectrolyte is polyanionic.
- 6. The method of Claim 5, wherein the polyanionic polyelectrolyte is poly(styrene sulfonic acid) or a salt thereof.

- 7. The method of Claim 3, wherein the template is optically active.
- 8. The method of Claim 7, wherein the optically active template is an oligonucleotide or a polynucleic acid or a salt thereof.
- 9. The method of Claim 8, wherein the polynucleic acid is 2'-deoxyribonucleic acid or a salt thereof.
- 10. The method of Claim 3, wherein the template is lignin sulfonic acid or a salt thereof.
- 11. The method of Claim 3, wherein the template is dodecylbenzene sulfonic acid or a salt thereof.
- 12. The method of Claim 1, wherein the aromatic monomer is a substituted or unsubstituted aromatic compound.
- 13. The method of Claim 12, wherein the aromatic compound is an aniline.
- 14. The method of Claim 13, wherein the aniline is 2-methoxy-5 methylaniline.

- 15. The method of Claim 12, wherein the aromatic compound is a phenol.
- 16. The method of Claim 13, wherein the complex formed is a water-soluble complex of a polyaniline and the template.
- 17. The method of Claim 16, wherein the polyaniline is of an electrically-conducting emeraldine salt form.
- 18. The method of Claim 15, wherein the complex formed is a water-soluble complex of polyphenol and the template.
- 19. The method of Claim 3, wherein the polymerized aromatic monomer complexed to the template has a macro-asymmetry.
- 20. A method for polymerization of an electroactive polymer, the method comprising the steps of

dissolving polystyrene sulfonate in deionized water at a pH of 1.0-2.0 to produce a solution;

adding polyethylene glycol-hematin to the solution;

adding hydrogen peroxide in small increments to the solution;

stirring the solution to complete polymerization;
effecting dialysis of the polymerized material; and
drying the material under a vacuum.

- 21. The method in accordance with claim 20 wherein the dried material exhibits a gravimetric yield of at least about 95%.
- 22. The method in accordance with claim 20 wherein the polymer comprises pyrrole.
- 23. The method in accordance with claim 20 wherein the polymer comprises poly (3,4)-ethylenedioxythiophene.
- 24. The method in accordance with claim 20 wherein the polymer comprises pyrrole and (3,4)-ethylenedioxythiophene, each at a concentration of about 0.2 mM.
- 25. The method in accordance with claim 20 wherein the polymer comprises pyrrole and aniline, each at a concentration of about 0.2 mM.
- 26. The method in accordance with claim 20 wherein the polymer comprises aniline and (3,4)-ethylenedioxythiophene.

- 27. The method in accordance with claim 20 wherein the polymer comprises pyrrole, aniline and (3,4)-ethylenedioxythiophene, each at a concentration of about 0.2 mM.
- 28. The method in accordance with claim 22 wherein the pH is about 2.0.
- 29. The method in accordance with claim 23 wherein the pH is about 1.0.
- 30. The method in accordance with claim 24 wherein the pH is about 1.0.
- 31. The method in accordance with claim 24 wherein the pH is about 2.0.
- 32. The method in accordance with claim 25 wherein the pH is about 2.0.
- 33. The method in accordance with claim 26 wherein the pH is about 2.0.
- 34. The method in accordance with claim 27 wherein the pH is about 2.0.

- 35. The method in accordance with claim 30 wherein conductivity of the dried material is in the range of 0.1 1.0 S/cm.
- 36. The method in accordance with claim 31 wherein the drying of the material is undertaken at about 60°C and conductivity of the dried material is in the range of 0.1-1.0 S/cm.
- 37. A method of preparing a derivatized hematin, the method comprising reacting hematin with one or more amphipathic compounds, thereby forming the derivatized hematin.
- 38. The method of Claim 37, wherein the hematin is reacted with one or more amphipathic compounds in the presence of a carboxylic acid activating compound and an aprotic base.
- 39. The method of Claim 38, wherein the carboxylic acid activating compound is a dialkylcarbodiimide.
- 40. The method of Claim 37, wherein the amphipathic compound is a substituted or unsubstituted polyalkylene glycol.
- 41. The method of Claim 40, wherein the polyalkylene glycol is polyethylene glycol.